

Claims

1. An electromagnetic switch device for star-delta connections comprising:

a body;

5 first through third power terminals arranged at one side portion of the body on an upper surface of the body and respectively connected to three-phase power lines;

10 first through third main terminals arranged at an intermediate portion of the body on the upper surface of the body and respectively connected to one-side terminals of a three-phase electric motor;

15 first through third star-delta terminals arranged at the other side portion of the body on the upper surface of the body and connected to the other-side terminals of the three-phase electric motor, respectively;

20 a star connection plate set on the upper surface of the body and adapted to connect the first through third star-delta terminals to a star circuit;

first through third contacts set beneath the star connection plate and adapted to connect the first through third star-delta terminals to a delta circuit;

25 a timer assembled to the body at a bottom of the body while being integral with the body, the timer serving to control a start-up time for the three-phase motor;

30 an electromagnet for a main circuit and an electromagnet for star-delta connections each including a fixed core and a coil assembled in the interior of the body, each of the electromagnets being selectively magnetized in accordance with a cooperation of the fixed core and coil thereof;

35 a main circuit switching unit assembled to an upper portion of the body at one side of the body so

that it is integral with the body, the main circuit switching unit serving to selectively connect the first through third power terminals with the first through third main terminals, respectively, in accordance with
5 the magnetization of the main circuit-end electromagnet; and

a star-delta connection switching unit assembled to the upper portion of the body at the other side of the body so that it is integral with the body, the star-delta connection switching unit serving to connect the star connection plate to the first through third star-delta terminals in accordance with the magnetization of the main circuit-end electromagnet under a condition in which the first through third power terminals are
10 connected with the first through third main terminals, thereby allowing the three-phase motor to be start up in a star connection state, the star-delta connection switching unit also serving to connect the first through third delta connection contacts to the first through
15 third star-delta terminals when the star-delta connection-end electromagnet is magnetized in accordance with an operation of the timer after the start-up of the three-phase motor, thereby causing the three-phase motor
20 to be driven in a delta connection state.

25 2. (Deleted)

3. (Deleted)

4. (Deleted)

30 5. The electromagnetic switch device according to claim 1, wherein the star-delta switching unit comprises:

a star-delta connection-end moving core adapted to

move vertically in accordance with a magnetization of the star-delta connection-end electromagnet;

a star-delta connectiona connection-end vermoving member integrally coupled to the star-delta connection-end moving core and adapted to move vertically along with the star-delta connection-end moving core;

first through third star connection-end moving members adapted to move upwardly along with the star-delta connection-end vertical moving member in accordance with a magnetization of the main circuit-end electromagnet under a condition in which the first through third main terminals are connected to the first through third power thermals, so that they are connected to the first through third star-delta terminals while being connected to the star connection plate, thereby allowing the three-phase electric motor to be started up in the star connection state; and

first through third delta connection-end moving members adapted to move downwardly along with the star-delta connection-end vertical moving member when the star-delta connection-end electromagnet is magnetized after a time set by the timer elapses, following the start-up of the three-phase electric motor in the star connection state, so that they are connected to the first through third star-delta terminals while being connected to the first through third delta connection contacts, thereby causing the three-phase electric motor to be driven in the delta connection state.

6. The electromagnetic switch device according to claim 1, wherein the star-delta switching unit further comprises:

star-delta connection-end compression coil springs adapted to always urge the star-delta connection-end vertical moving member to move upwardly, thereby

allowing the three-phase electric motor to be started up in the star connection state, the star-delta star-delta connecti

5 coefficient lower than a magnetic force of the star-delta connection-end electromagnet to allow the star-delta connection-end vertical moving member to move downwardly against the urging force of the star-delta connection-end compression coil springs when the star-delta connection-end electromagnet is magnetized,
10 thereby causing the three-phase electric motor to be driven in the delta connection state, the star-delta connection-end compression coil springs being arranged in pair so that those of each pair are disposed at opposite sides of the star-delta connection-end
15 electromagnet; respectively; and

star-delta connection-end damping springs for damping impact generated when the first through third star connection-end moving members abruptly contact associated contact portions as the star-delta connection-end vertical moving member moves upwardly by virtue of the urging force of the star-delta connection-end compression coil springs while damping impact generated when the first through third star connection-end moving members abruptly contact associated fixed
20 contacts as the star-delta connection-end vertical moving member moves upwardly by virtue of the magnetic force of the star-delta connection-end electromagnet,
25 respectively, the star-delta connection-end damping springs being arranged in the form of a plurality of sets each including three star-delta connection-end damping springs.

7. (Deleted)